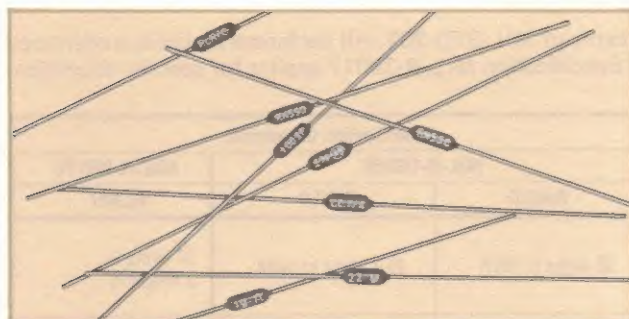




0.125 Watt at 125°C
0.25 Watt at 70°C
0.5 Watt at 70°C

CERMET FILM
FIXED
RESISTORS

TYPE
CC



- Consistent Quality
- High Stability
- Unique Design
- Universal Applications
- Dual Resistance Marking
- Extended Resistance Range
- Multiple Power Ratings
- $TCR \pm 100 \text{ PPM}/^{\circ}\text{C}$ and $\pm 50 \text{ PPM}/^{\circ}\text{C}$

Allen-Bradley combines 40 years of manufacturing excellence in producing the most reliable composition resistors known, and 15 years of technological and manufacturing experience in metal film resistive elements, to produce a cermet film resistor unequalled for stability and performance.

OUTSTANDING FEATURES

CAPLESS CONSTRUCTION — Sintered end terminations with high temperature metallurgically fused leads embedded into the core provide a reliable interconnection that eliminates end caps, which are one of the major causes of film resistor failures.

SUPERIOR PERFORMANCE LEVELS — Substantially better performance characteristics than industry standard requirements are shown in the specification comparison tables. This outstanding performance is the result of exclusive Allen-Bradley advanced technological developments in thick film cermet resistive elements. The ruggedness and durability of cermet together with the unique termination design provides new opportunities for circuit designers to obtain outstanding stability, performance, and reliability in one small size resistor.

ALUMINA CORE — High purity alumina core produces superior thermal characteristics to reduce hot spot temperature, and provides high strength to resist fractures that can cause failures.

EXCEPTIONALLY WIDE RANGE OF VALUES — Available in standard preferred number values and non-standard values from 10 ohms to 22.1 megohms in 1% (E 96 series) tolerance and from 10 ohms to 499K ohms in 0.5% (E 192 series) tolerance.

HIGH OVERLOAD CAPABILITY — Rugged construction, large alumina core, and thick film resistance element provide outstanding ability to withstand high overloads or repeated thermal shock.

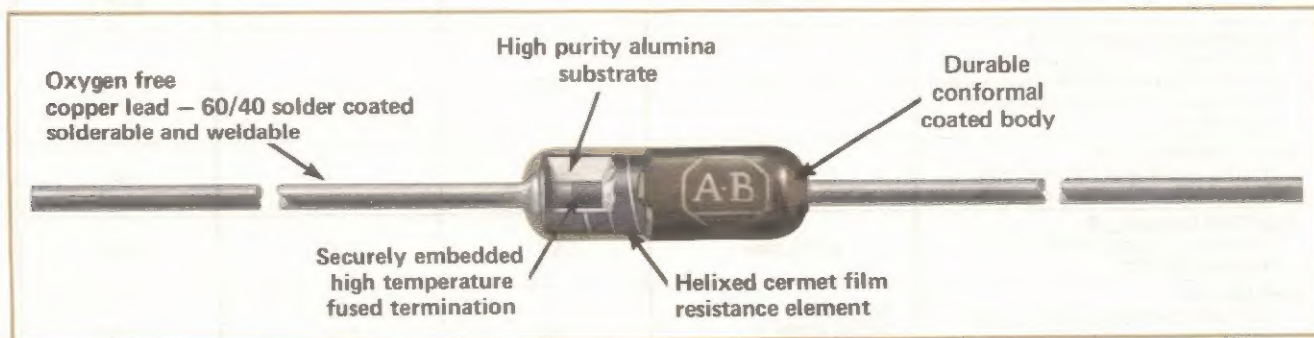
MILITARY QUALIFICATION — MIL-R-10509F approved for Style RN55, Characteristic D (100 PPM) and Characteristic C (50 PPM). Also MIL-R-39017C approved for Style RLR07.

INSULATION COATING — Specially formulated conformal coating material maintains its high insulation resistance properties even under prolonged high humidity exposure.

SOLDERABLE/WELDABLE LEADS — Oxygen free copper lead material is readily weldable under a wide range of weld schedules. Hot solder coated finish remains easy to solder even after long periods in stock. Ultra thick solder coating provides outstanding solderability even under adverse conditions.

DURABLE MARKINGS — Baked-on markings are highly resistant to flux and solvents encountered in PC board soldering operations, and also resist abrasion and chipping associated with automatic handling machinery. Meets MIL-STD-202, Method 215 Resistance to Solvents requirements. Clear and easily readable standard marking employs resistance value **marked in two places** on the body providing easy identification without regard to orientation.

HIGHER POWER RATING — May be used in 0.5 watt applications where maximum voltage is limited to 250 volts. Electrical performance is within the same limits specified for 0.25 watt rating.



GENERAL CHARACTERISTICS

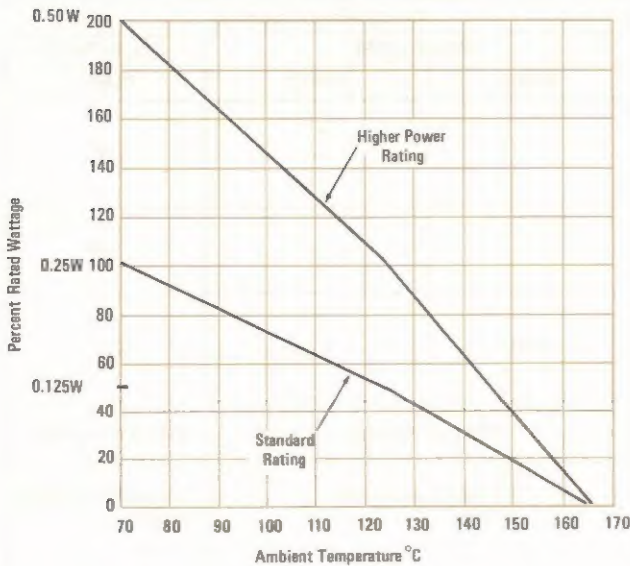
All measurements made in accordance with the general requirements of MIL-STD-202. All performance limits understood as reading $\pm (X\% + 0.05 \text{ ohm})$ maximum. Established Reliability Specification MIL-R-39017 applies for specific conditions such as mounting, test procedures, sequence of tests, etc.

Characteristic	ALLEN-BRADLEY CC	Specification Comparison		
		MIL-R-10509F		MIL-R-39017C
		RN55D	RN55C	RLR07
Nominal Resistance Range Standard EIA, MIL & I.E.C. E 96 values	10 ohms to 22.1 megohms (100 PPM) 10 ohms to 499K (50 PPM)	10 ohms to 301K	49.9 ohms to 100K	10 ohms to 1 megohm
Standard Tolerance	$\pm 0.5\%$, $\pm 1\%$	$\pm 1\%$	$\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1.0\%$	$\pm 1\%$, $\pm 2\%$
Power Rating Maximum continuous rated watts	0.125 watt at 125°C 0.25 watt at 70°C 0.5 watt at 70°C	0.125 watt at 70°C	0.1 watt at 125°C	0.25 watt at 70°C
Maximum Ambient Temperature Linear Derating to Zero	165°C 0.25 watt at 70°C 0.125 watt at 125°C 0 watt at 165°C	165°C 0.125 watt at 70°C 0.0625 watt at 125°C 0 watt at 165°C	175°C 0.1 watt at 125°C 0 watt at 175°C	150°C 0.25 watt at 70°C 0 watt at 150°C
Rated Continuous Working Voltage (RCWV) Based on nominal resistance (R) in ohms	$\sqrt{0.25 \times R}$ or 250 volts, whichever is less	$\sqrt{0.125 \times R}$ or 200 volts, whichever is less	$\sqrt{0.1 \times R}$ or 200 volts, whichever is less	$\sqrt{0.25 \times R}$ or 250 volts, whichever is less
Dielectric Withstanding Voltage ΔR Atmospheric pressure Reduced pressure	0.1%, max. 500 VRMS 250 VRMS	0.5% 450 VRMS 200 VRMS	0.25% 450 VRMS 200 VRMS	0.25% 500 VRMS 250 VRMS
Insulation Resistance	10,000 megohms, min.	10,000 megohms		1,000 megohms
Weight (Approximate) Resistor with nominal length leads	0.3 gram	—		0.5 gram, max.
Terminal Leads	Oxygen free copper Type C per MIL-STD-1276 with 60/40 solder coating	Solderable		Type C per MIL-STD-1276
Shelf Life ΔR per year	Less than 0.1%	—		0.2% average

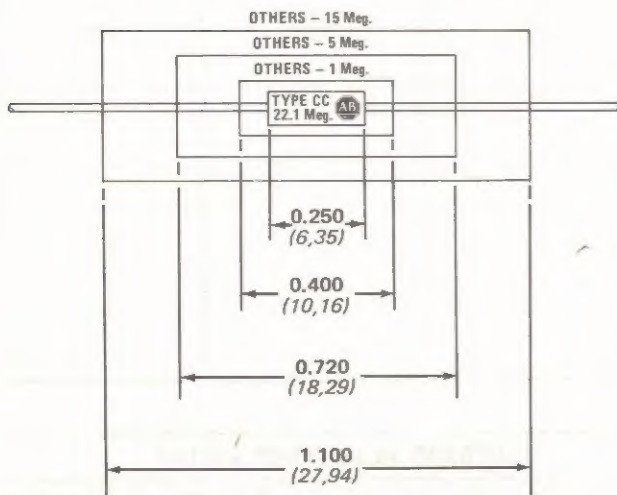
PERFORMANCE CHARACTERISTICS

Characteristic	ALLEN-BRADLEY CC	Specification Comparison		
		MIL-R-10509F		MIL-R-39017C
		RN55D	RN55C	RLR07
Temperature Coefficient ΔR At any temperature from -55°C to $+165^\circ\text{C}$, referred to $+25^\circ\text{C}$ value	$\pm 100 \text{ PPM}/^\circ\text{C}$, max. (10 ohms to 22.1 megohms) $\pm 50 \text{ PPM}/^\circ\text{C}$, max. (10 ohms to 499K)	$+200$ $-500 \text{ PPM}/^\circ\text{C}$	$\pm 50 \text{ PPM}/^\circ\text{C}$	$\pm 100 \text{ PPM}/^\circ\text{C}$
Moisture Resistance ΔR 10 cycles per Method 106 of MIL-STD-202	0.4%, max.	1.5%	0.5%	1.0%
Thermal Shock ΔR 5 cycles of -65°C to $+150^\circ\text{C}$ per Method 107 of MIL-STD-202	0.1%, max.	0.5%	0.25%	0.25%
Low Temperature Storage ΔR 24 hours at -65°C	0.1%, max.	—	—	0.25%
Low Temperature Operation ΔR After 1 hour at -55°C , apply RCWV for 45 minutes. Remove RCWV, return to room temperature. ΔR measured within 24 hours after test	0.1%, max.	0.5%	0.25%	0.25%
Power Conditioning ΔR 24 hours operating at 1.5 times rated power (0.375 watt) at 25°C ambient	0.5%, max.	—	—	0.5%
Short Time Overload ΔR 5 seconds at 2.5 times RCWV, but not exceeding 500 volts	0.25%, max.	0.5%	0.25%	0.5%
Load Life ΔR 2000 hours operating at RCWV, at 70°C ambient with duty cycle of 1.5 hours "on", 0.5 hour "off"	0.5%, max. 0.015% \bar{x} typical 0.065% 3 sigma typical	1.0%	0.5%	2.0%

DERATING CURVE



SIZE COMPARISON



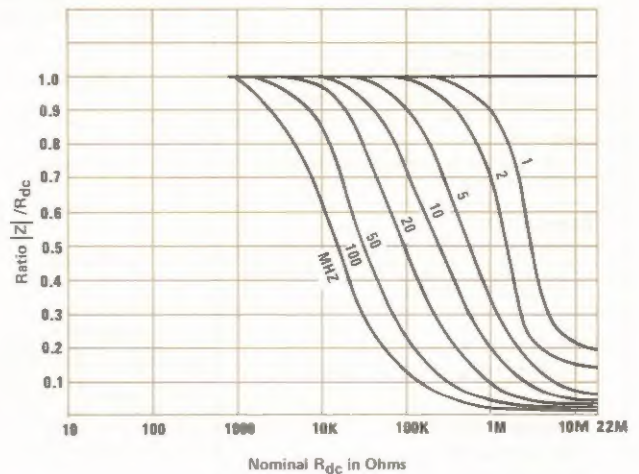
Basic dimensions in inches.
Dimensions shown in *ITALICS*
are in millimeters.

TEMPERATURE RISE

Typical °C temperature rise in thermal systems similar to those used for load life testing. Operating temperature equals ambient temperature plus temperature rise.

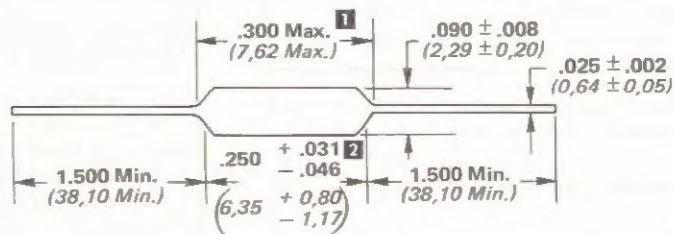
Wattage Load	Ambient Temperature		
	25°C	70°C	125°C
0.125 W	10°	10°	10°
0.25 W	25°	25°	25°
0.5 W	50°	50°	45°

HIGH FREQUENCY CHARACTERISTICS



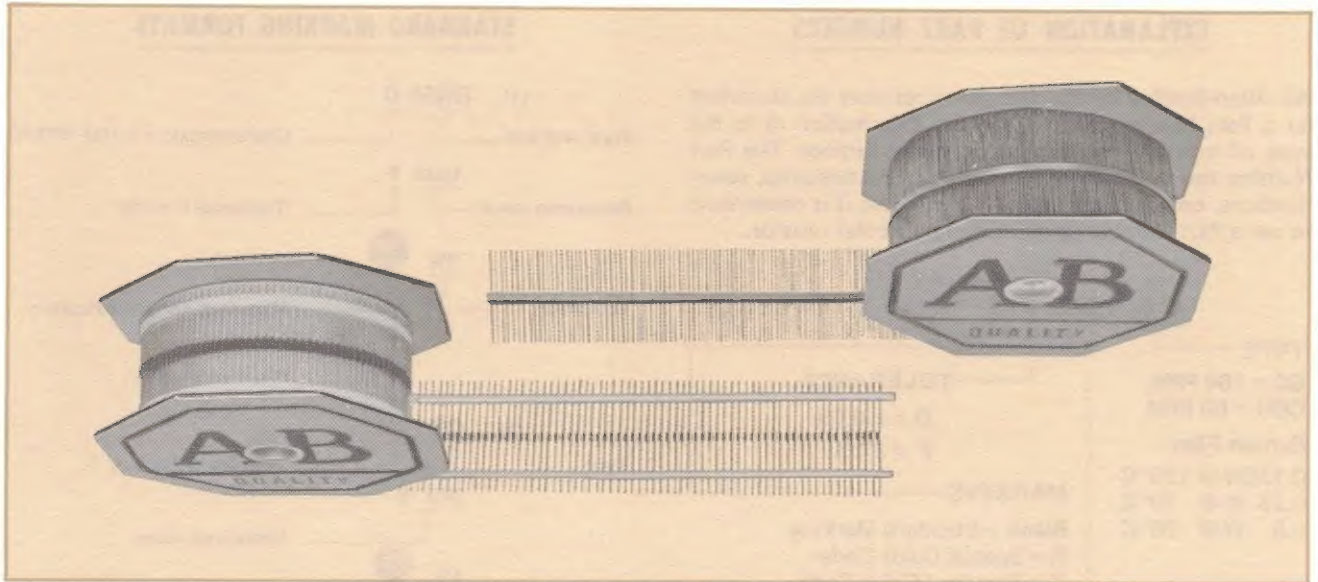
The curves above give typical values of impedance to DC resistance ratio from 100 KHz to 100 MHz. Care was taken in test fixture design to prevent distributed capacitance to ground along the length of the resistor from contributing to measured values. Lead length was held at one quarter inch to standardize the lead inductance contribution. User's circuit variations from test conditions in mounting position and lead length can have a significant effect on the high frequency characteristics.

DIMENSIONS



1 Maximum length is "clean lead" to "clean lead"

2 The end of the body is that point at which the body diameter equals .038 (0,97)



REEL PACKAGED — Allen-Bradley cermet film fixed resistors may be obtained reel packaged to facilitate automatic assembly operations.

READY TO USE — Resistors can be reel packaged for use directly on automatic assembly equipment.

36-INCH LEADER — A minimum of 36 inches (914.40 mm) of free tape is provided at each end of the reel for splicing purposes.

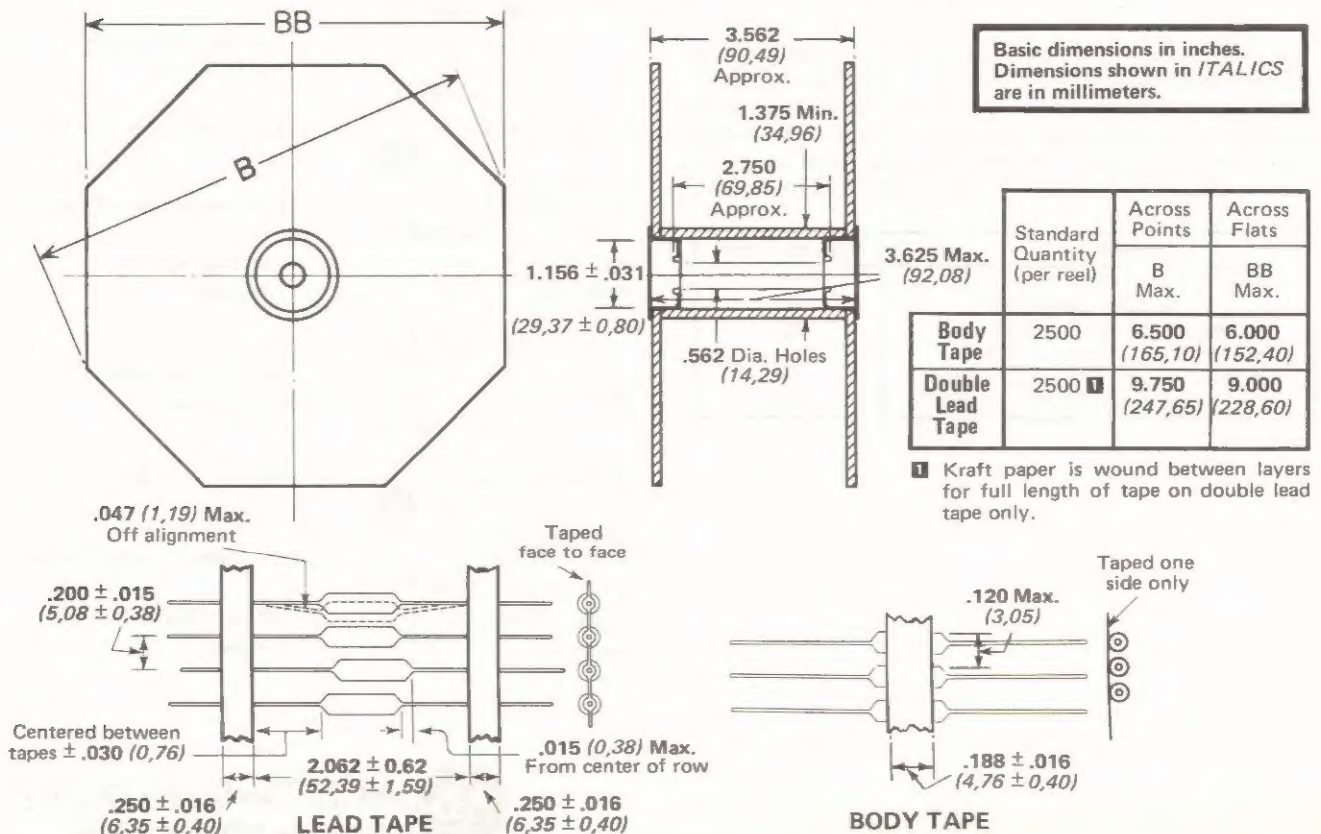
HEAVY DUTY REEL CONSTRUCTION — The octag-

onal reels are made from corrugated fiberboard sides glued to a heavy fiberwound core. The reel is provided with metal bearings having a .562 inch (14.29 mm) hole.

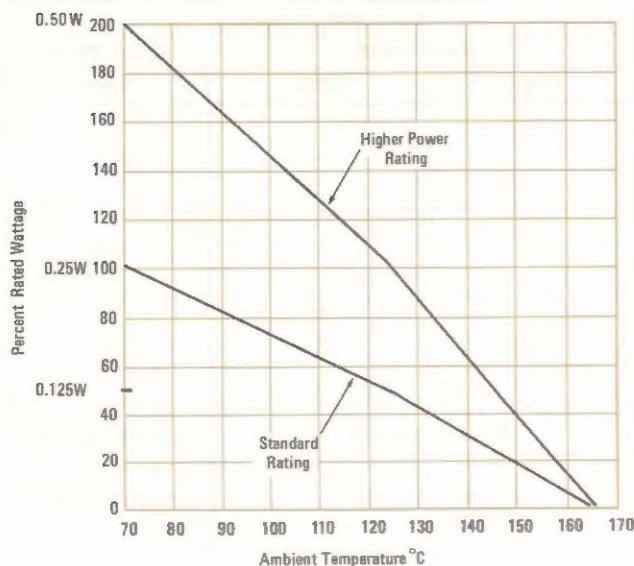
EXPENDABLE — Since these reels are intended to be used as one-time dispensers of resistors, there are no storage problems, no returns.

Note: Long term storage of adhesive taped reel packaged resistors is not recommended due to normal adhesive aging.

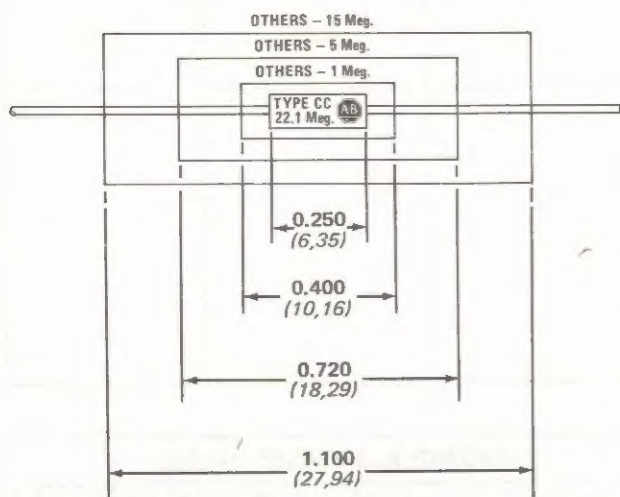
REEL PACKAGING DIMENSIONS



DERATING CURVE



SIZE COMPARISON



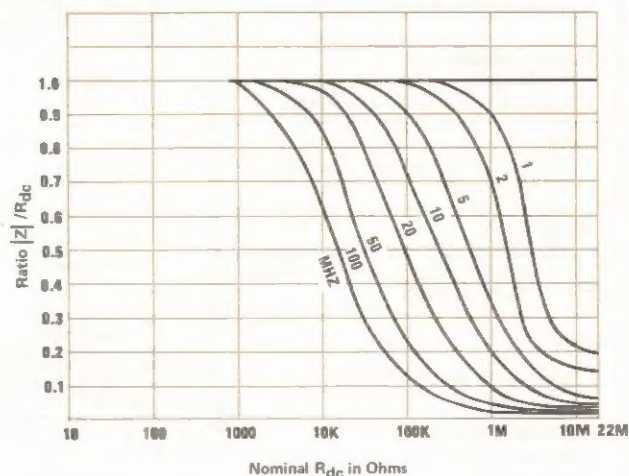
Basic dimensions in inches.
Dimensions shown in *ITALICS*
are in millimeters.

TEMPERATURE RISE

Typical °C temperature rise in thermal systems similar to those used for load life testing. Operating temperature equals ambient temperature plus temperature rise.

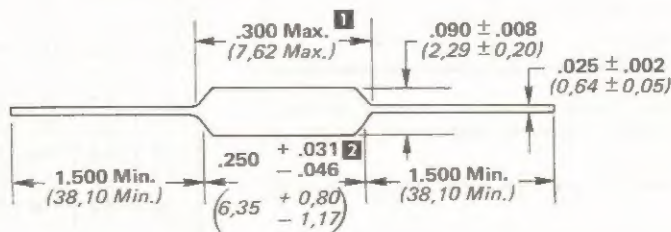
Wattage Load	Ambient Temperature		
	25°C	70°C	125°C
0.125 W	10°	10°	10°
0.25 W	25°	25°	25°
0.5 W	50°	50°	45°

HIGH FREQUENCY CHARACTERISTICS



The curves above give typical values of impedance to DC resistance ratio from 100 KHz to 100 MHz. Care was taken in test fixture design to prevent distributed capacitance to ground along the length of the resistor from contributing to measured values. Lead length was held at one quarter inch to standardize the lead inductance contribution. User's circuit variations from test conditions in mounting position and lead length can have a significant effect on the high frequency characteristics.

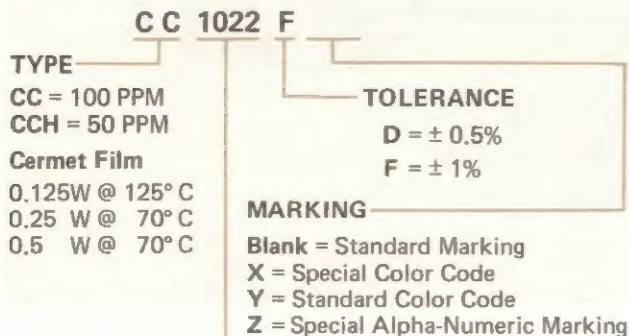
DIMENSIONS



- 1 Maximum length is "clean lead" to "clean lead"
- 2 The end of the body is that point at which the body diameter equals .038 (0,97)

EXPLANATION OF PART NUMBERS

All Allen-Bradley cermet film fixed resistors are identified by a Part Number which provides information as to the type of resistor, resistance value, and tolerance. The Part Number can be used for identification on drawings, specifications, ordering, and other areas where it is convenient to use a Part Number to describe a particular resistor.



RESISTANCE

Expressed in ohms and identified by a four digit number. First three digits represent significant figures. Fourth digit specifies the number of zeros to follow, except below 100 ohms the letter "R" represents decimal point. When "R" is used, succeeding digits are significant figures.

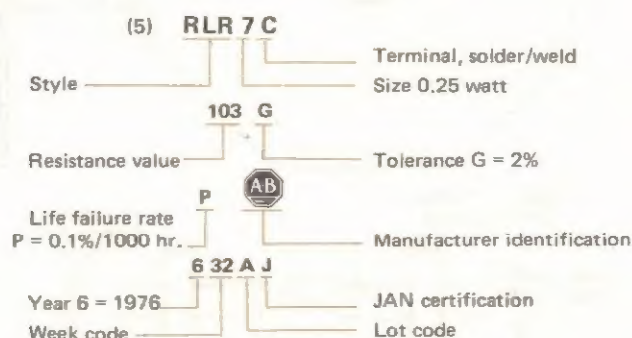
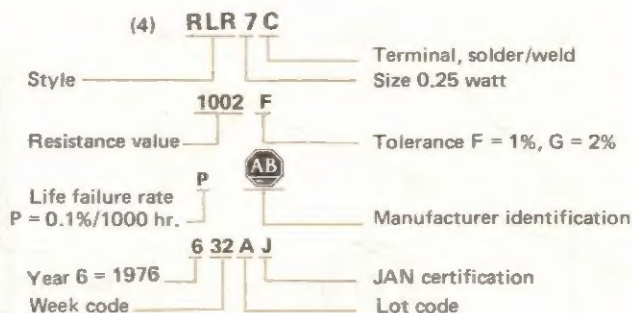
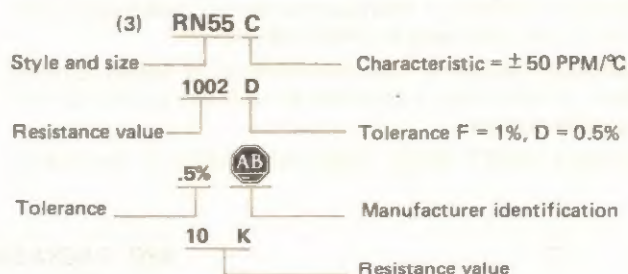
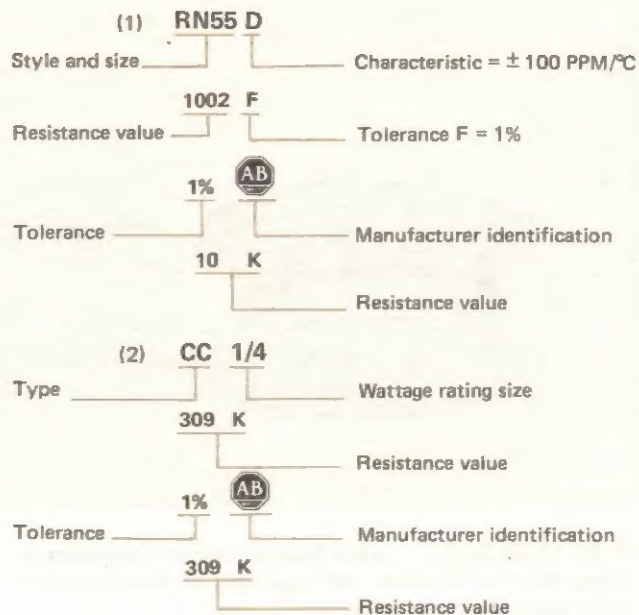
Example: 10R5 = 10.5 ohms
 1022 = 10,200 ohms

EXPLANATION OF MARKING

The standard marking that appears on the resistor for the standard applicable units indicated in the table is shown below. Special markings for any value are available upon request, up to 5 characters per line, 4 lines maximum (use the Z suffix to the part number). EIA color code or special color codes (X or Y suffix) are also available upon request.

Applicable Units	Marking Format
100 PPM, 1%, 10 ohms to 301K	(1)
100 PPM, 1%, 309K and higher	(2)
50 PPM, 1%, 10 ohms to 499K	(3)
50 PPM, 0.5%, 10 ohms to 499K	(3)
100 PPM, Style RLR07, MIL-R-39017C	(4)
100 PPM, Style RLR07, MIL-R-39017B	(5)

STANDARD MARKING FORMATS



ALLEN-BRADLEY
 Milwaukee, Wisconsin 53204